

Translation

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference V52013WO	FOR FURTHER ACTION See Form PCT/IPEA/416	
International application No. PCT/DE2004/001151	International filing date (day/month/year) 07.06.2004	Priority date (day/month/year) 07.06.2003
International Patent Classification (IPC) or national classification and IPC		
Applicant MAHLE GMBH		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of **6** sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

a. ☐ (sent to the applicant and to the International Bureau) a total of _____ sheets, as follows:

☐ sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

b. ☐ (sent to the International Bureau only) a total of _____ (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

<input checked="" type="checkbox"/>	Box No. I	Basis of the report
<input type="checkbox"/>	Box No. II	Priority
<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
<input type="checkbox"/>	Box No. IV	Lack of unity of invention
<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
<input type="checkbox"/>	Box No. VI	Certain documents cited
<input type="checkbox"/>	Box No. VII	Certain defects in the international application
<input type="checkbox"/>	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

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International application No.

PCT/DE2004/001151

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language _____ which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 2-5 _____ as originally filed/furnished
- pages* 1, 1a _____ received by this Authority on 17.12.2004 with letter of 10.12.2004
- pages* _____ received by this Authority on _____
- ☒ the claims:
- nos. _____ as originally filed/furnished
- nos.* _____ as amended (together with any statement) under Article 19
- nos.* 1-3 _____ received by this Authority on 17.12.2004 with letter of 10.12.2004
- nos.* _____ received by this Authority on _____
- ☒ the drawings:
- sheets 1/2, 2/2 _____ as originally filed/furnished
- sheets* _____ received by this Authority on _____
- sheets* _____ received by this Authority on _____
- ☐ a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages _____
- ☐ the claims, nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (*specify*): _____
- ☐ any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-3	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-3	NO
Industrial applicability (IA)	Claims	1-3	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

1. This report makes reference to the following documents:

D1: DE 101 42 980 A (KS KOLBENSCHMIDT GMBH), 27 March 2003 (2003-03-27)

D2: EP-A-0 364 810 (WELLWORTHY LTD), 25 April 1990 (1990-04-25)

D3: DE 199 22 809 A (MAHLE GMBH), 23 November 2000 (2000-11-23)

2. The present application does not meet the requirements of PCT Article 33(1) because the subject matter of claims 1-3 does not involve an inventive step (PCT Article 33(3)).

2.1 Claim 1: document **D1** is considered to constitute the prior art closest to the subject matter of claim 1 and discloses (the references in parentheses are to that document) a piston for an internal combustion engine (column 2, lines 33 and 34), the piston comprising a circular cylindrical top region (9) for receiving snap ring grooves and a bottom region (3) with two hubs (4) for

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receiving a gudgeon pin, the hubs being set back towards the central axis of the piston, while recesses (10) open towards the bottom region (3) are located in the top region (9) in the vicinity of the hubs, the recesses comprising undercuts (12) in the region between the hubs and the top region.

The difference between the subject matter of claim 1 and the subject matter of document D1 is that document D1 does not mention any ribs.

The subject matter of claim 1 is novel because of this difference.

Although document D1 does not mention any ribs, ribs for pistons are well known to a person skilled in the art. Document D2, for example, shows a piston with ribs in the top piston region (figures 1 and 2). A person skilled in the art would thus readily arrange a rib in the undercut (12) described in document D1, whenever necessary (for example if required by the piston size). Consequently, the subject matter of claim 1 cannot be considered inventive.

2.2 Claim 2: document D1 shows a casting process for producing a piston, in which a casting mould with window inserts is used to produce recesses, in which process:

- a moulding is produced for generating the

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citations and explanations supporting such statement

recesses (10), as well as undercuts (12) that protrude into the region between the hubs (4) and the top region (9) of the piston upon casting of the piston (1),

- the mouldings are secured to respective window inserts (column 2, line 10),
- the piston is cast,
- the window inserts are removed from the finished cast pistons (column 3, lines 14-16), the moulding (12) separating from the window insert and remaining in the piston,
- and the moulding is then washed out of the piston (column 3, lines 25-29).

The subject matter of claim 2 and the disclosure of document D1 differs in that, in claim 2:

- a salt moulding is explicitly mentioned (document D1: "moulding"),
- incisions are made in the salt mouldings (to produce, when the piston is cast, the ribs arranged in the recesses and undercuts),
- the window inserts are swivelled away (document D1: pulled away or obliquely pulled away). Document D3, for example, shows how window inserts are swivelled away.

However, these missing features are well known to a person skilled in the art of casting. When producing the piston described in document D1, and aware of the disclosure of document D1, he would not need to be inventive to use a salt moulding

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and swivelling window inserts, according to the circumstances. The incisions in the salt mouldings (to produce the ribs located in the recesses and undercuts) would also be the easiest way to produce recesses and undercuts.

Consequently, the subject matter of claim 2 cannot be considered inventive (PCT Article 33(3)).

- 3.2 Claim 3: document D1 mentions (in column 2, line 7) pins for pinning up the moulding. It does not describe the pin geometry. However, it is well known to a demoulding easier. The conical pin geometry is therefore only one of many obvious possibilities from which a person skilled in the art would choose according to the circumstances in order to solve the problem addressed, without being inventive. The subject matter of claim 3 therefore cannot be considered inventive.